

REMARKS

The present application was filed on November 25, 1998 with claims 1-21. In the outstanding Office Action dated February 14, 2002, the Examiner rejected claims 5, 12 and 19 under 35 U.S.C. §112, second paragraph, and rejected claims 1-4, 6-11, 13-18, 20 and 21 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,169,723 (hereinafter "Fertner") in view of A.I. El-Arabawy et al., "Reduced Mobile Complexity Scheme for Fast Fading Channel Estimation in OFDM-FDD Mobile Communication Systems" (hereinafter "El-Arabawy").

In this response, Applicant amends the specification to update related application information, amends dependent claims 6, 13 and 20, and traverses the §112 and §103(a) rejections. Applicant respectfully requests reconsideration of the present application in view of the above amendments and the following remarks.

With regard to the §112 rejection, the Examiner argues that claims 5, 12 and 19 are unclear because each of the first and second subsets are constrained by respective claims 4, 11 and 18 to have the same number of carriers. Applicant respectfully submits that the Examiner is misreading claims 4, 11 and 18. For example, claim 4 specifies as follows, with emphasis supplied:

4. The method of claim 1 further including the step of assigning a first subset of M orthogonal frequency division multiplexed carriers to the uplink and a second subset of the M carriers to the downlink.

The language "of the M carriers" in the second and third line of the claim makes it clear that there is a total of M carriers, and that the first and second subsets are each subsets of the total of M carriers. In other words, each of the first and second subsets as defined in claim 4 includes less than the total of M carriers. The interpretation put forward by the Examiner ignores the word "the" in the above-emphasized "of the M carriers" language. Applicant also refers the Examiner to page 8, line 29 to page 9, line 4 of the specification, which states as follows on this point, with emphasis supplied:

As shown in FIG. 11, a downlink portion 102 and an uplink portion 104 are separated in frequency by a variable boundary 106. There are a total of M orthogonal frequency tones

110 in the band of interest. In the FIG. 11 example, tones 1 through k are assigned to the uplink portion 104, while tones $k+1$ to M are assigned to the downlink portion 102.

Applicant therefore submits that claim 5 is indeed consistent with claim 4 and with the specification. The interpretation put forth by the Examiner ignores specific claim language, is inconsistent with the specification, and is therefore believed to be improper. The §112 rejection of claims 12 and 19 is similarly deficient in this regard. Applicant therefore respectfully requests that the §112 rejection be withdrawn.

Applicant notes that claims 5, 12 and 19 are not subject to the §103(a) rejection in the outstanding Office Action. Therefore, should the §112 rejection be withdrawn as requested by Applicant, these dependent claims should be indicated as containing allowable subject matter.

With regard to the §103(a) rejection, the Examiner argues that claims 1-4, 6-11, 13-18, 20 and 21 are obvious in view of the combined teachings of Fertner and El-Arabawy. Applicant respectfully disagrees. The Examiner in formulating the §103(a) rejection acknowledges that the Fertner reference fails to meet the limitations of independent claims 1, 8 and 15 regarding communicating information between a plurality of subscriber units and a base station in a cell of a wireless cellular communication system, but alleges that El-Arabawy overcomes these deficiencies of Fertner.

Applicant notes that each of independent claims 1, 8 and 15 includes a limitation relating to separation of communications on an uplink of the wireless communication system from communications on the downlink using orthogonal frequency division multiplexing (OFDM). Applicant submits that, for the reasons given below, the particular portions of the Fertner and El-Arabawy references relied on by the Examiner in rejecting independent claims 1, 8 and 15 fail to teach or suggest at least this aspect of the claimed invention.

The Examiner relies on column 11, lines 36-41, and column 12, lines 30-35, of the Fertner reference in formulating the §103(a) rejection of independent claims 1, 8 and 15 over Fertner and El-Arabawy. However, Applicant believes that this portion of the Fertner reference fails to meet the above-noted limitation of claims 1, 8 and 15. Although the Examiner refers to column 12, lines 36-47, with regard to the rejection of dependent claims 4, 11 and 18, this portion of the Fertner reference is apparently not relied upon by the Examiner in the rejection of independent claims 1, 8 and 15.

Applicant therefore traverses the §103(a) rejection of independent claims 1, 8 and 15, on the ground that the column 11, lines 36-41, and column 12, lines 30-35 portions of the Fertner reference cited by the Examiner in support of the rejection of independent claims 1, 8 and 15 fail to meet at least the above-noted limitation regarding separation of uplink and downlink communications using OFDM.

The Examiner relies on the Abstract and Introduction portions of El-Arabawy in rejecting independent claims 1, 8 and 15. However, although these portions of El-Arabawy mention the use of OFDM in a wireless communication system, they describe the utilization of OFDM for downlink or base-to-mobile communications, and not the utilization of OFDM in conjunction with separation of uplink communications from downlink communications as claimed. Applicant refers the Examiner to FIG. 1 of El-Arabawy which shows that the OFDM signal is a base-to-mobile or downlink signal. Unlike the base-to-mobile or downlink signal in FIG. 1 of El-Arabawy, the mobile-to-base or uplink signal in FIG. 1 of El-Arabawy is not specified as being an OFDM signal, but is instead referred to as simply a "mobile transmitted signal." As noted above, there is no teaching or suggestion in the El-Arabawy reference regarding the claimed separation of uplink and downlink communications using OFDM.

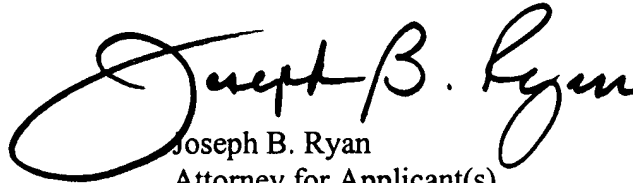
Applicant further submits that there is no motivation for combining Fertner and El-Arabawy in the manner urged by the Examiner. More particularly, since El-Arabawy teaches use of OFDM as a base-to-mobile or downlink signal only, it is not combinable with the Fertner reference in the manner urged by the Examiner, since those skilled in the art would not be motivated by any explicit teaching of Fertner or El-Arabawy to make the proposed combination.

Applicant has amended dependent claims 6, 13 and 20 to clarify that the inverse Fourier transform operation is applied to the M orthogonal frequency division multiplexed carriers in a transmitter of the system. Applicant submits that the amendment is made for purposes of clarification only, and does not constitute a narrowing amendment made for purposes of patentability. Support for the amendment can be found in the specification at, for example, page 9, lines 25-29.

Attached hereto is a marked-up version of the changes made to the specification and claims by the present Amendment.

In view of the above, Applicant believes that claims 1-21 as amended are in condition for allowance, and respectfully requests the withdrawal of the §112 and §103(a) rejections.

Respectfully submitted,

A handwritten signature in black ink, reading "Joseph B. Ryan". The signature is fluid and cursive, with a large, looping initial "J" and a stylized "B".

Date: May 13, 2002

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

The paragraph beginning on page 1, line 6, has been amended as follows:

The present application is related to the following U.S. Patent Applications, both filed concurrently herewith in the name of inventor Syed Aon Mujtaba: U.S. Patent Application Serial No. 09/200,522 entitled "Methods and Apparatus for Wireless Communication Using Time Division Duplex Time-Slotted CDMA," and U.S. Patent Application Serial No. 09/200,521 entitled "Methods and Apparatus for Wireless Communication Using Code Division Duplex Time-Slotted CDMA."

IN THE CLAIMS

6. (Amended) The method of claim 4 further including the step of applying an inverse Fourier transform operation to [generate] the M orthogonal frequency division multiplexed carriers in at least one of a downlink transmitter and an uplink transmitter of the system.

13. (Amended) The apparatus of claim 11 wherein an inverse Fourier transform operation is applied to [generate] the M orthogonal frequency division multiplexed carriers in a transmitter of the system.

20. (Amended) The apparatus of claim 18 wherein an inverse Fourier transform operation is applied to [generate] the M orthogonal frequency division multiplexed carriers in a transmitter of the system.